

Algebraic Manipulation

Grade 5-6 Olympic Math

January 16, 2016

1. Solve for x .

(a) $2x + 1 = 5$

(b) $-x + 3 = 10$

(c) $x - y = 3$

(d) $5x + 3 = -17$

(e) $3(x + 1) = 9$

(f) $\frac{10}{x} + 2 = 7$

(g) $x + y + z = 180$

(h) $4x - 3 = 2x + 7$

2. Billy loves playing Hearthstone. Today Blizzard offers a deal where each player who buys at least one card pack gets three packs for free. Each pack costs \$4, and Billy has \$36 to spend today. How many card packs can Billy get in total today?

3. Suppose that $\triangle ABC$ and $\triangle DEF$ are similar. That is,

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}.$$

Suppose that $AB = 6$, $BC = 8$, $CA = 10$, and $EF = 12$. Find DE and FD .

4. Jim is on a road trip. He drives for x hours at 80 km/h and y hours at 100 km/h. In total, he drives for z km. (Recall that distance = speed \times time.)

(a) Express z in terms of x and y .

(b) Suppose $x = 3$ and $z = 540$. Solve for y .

5. David has a younger sister Emily. Four years ago David's age was twice that of Emily. David is 18 years old now. How old is Emily?